

An Analysis of Autism as a Contingency-Shaped Disorder of Verbal Behavior

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This paper analyzes autism as a contingency-shaped disorder of verbal behavior. Contingencies of reinforcement in effect during the first to third year of a child's life may operate to establish and maintain those behaviors that later result in a diagnosis of autism. While neurobiological variables may, in some cases, predispose some children to be more or less responsive to environmental variables than others, our analysis suggests that reliance on neurobiological variables as causal factors in autism is unnecessary. We present six paradigms that may play critical etiologic roles in the development of behaviors labeled as autistic. Recognizing these contingencies and their resulting behaviors during the first two years of a child's life may contribute substantially to earlier identification, more effective treatment and, quite possibly, to the development of Applied Behavior Analysis programs for the prevention of autism that could be implemented immediately. Conceptualizing autism as a contingency-shaped disorder of verbal behavior may provide a new and potentially more effective paradigm for behavioral research and treatment in autism.

Autism is widely regarded as one of the most severe of childhood behavioral disorders (Barton-Cohen, Allen, & Gillberg, 1992). The effects of autism are pervasive and interfere with the acquisition of normal behavioral repertoires across almost every area of human functioning. During the past 30 years, extensive research has been devoted to the development and implementation of effective behavioral treatments and to an analysis of the etiology of autism. Since Lovaas (1987) demonstrated that it is possible to achieve relatively total recovery in some young children diagnosed with autism by using an intensive 40-hour-per-week behavioral intervention, significant progress has been made in the behavioral treatment of children diagnosed with autism. These treatments have for the most part relied on a functional analysis of behaviors that are labeled as autistic (Charlop-Christy, & Kelso,

1997; Maurice, Green, & Foxx, 2001; Maurice, Green, & Luce, 1996; Leaf, & McEachin, 1999; Lovaas, 1977, 1981; Sundberg, & Partington, 1998).

Despite substantial progress in the treatment of autism, determining the etiology of those behaviors that may later result in a diagnosis of autism continues to be an unresolved issue. *The Advocate* reported that statistics recently released by the Autism Society of America (2002, p. 6) stated that autism is increasing at a rate of 10 to 17% per year. As a result there has been a strong advocacy for a substantial increase in research into the causes of autism. Discovering the cause of autism is considered by many professionals and autism advocates as essential in the development of more effective programs for the prevention and treatment of autism. Lee Grossman, President of the Autism Society of America, and Robert Beck, Executive Director, recently stated (2002), "After more than 50 years of study, no causes have been identified. There needs to be a geometric increase in research funding ... to determine the causes of autism" (p. 7).

Currently there are at least two major hypotheses regarding the causes of autism, those that are primarily neurobiological and those that are primarily behavioral. The neurobiological hypothesis attributes the cause of autism to a presumed but as yet unidentified neurobiological disorder. Conversely, behavioral theo-

Earlier versions of this paper were presented at the Association for Behavior Analysis, 25th annual meeting, Chicago, IL, May, 1999, and at the 26th annual meeting, Washington, DC, May, 2000. The authors express their appreciation to Jack Michael, Dick Malott, Mark Sundberg, and Hank Schlinger for their valuable recommendations on earlier versions of this manuscript. Send reprint requests to Philip W. Drash, Ph.D., BCBA, Autism Early Intervention Center, 2901 W. Busch Blvd., Suite 807, Tampa, FL, 33618; e-mail: inteldev@aol.com.

ries of autism describe how environmental contingencies operating during the first one to three years of a child's life may establish and maintain those behaviors that later result in the diagnosis of autism.

This paper presents a behavioral analysis of the etiology of those behaviors upon which a diagnosis of autism is based. Our analysis suggests that reinforcement contingencies operating during the first to third year of a child's life may play a substantial role in the development of the behaviors that are subsequently diagnosed as autism. We have previously published an analysis of contingencies of reinforcement that may lead to delay in acquisition of verbal behavior in typical young preschool children (Drash & Tudor, 1990, 1993). A similar analysis may also be applied to the shaping of behaviors that result in the diagnosis of autism (Drash, High, & Tudor, 1999; Drash & Tudor, 1999, 2000).

We recognize that the prevailing opinion among many professionals and parents, including many behavior analysts, is that a disorder as severe and debilitating as autism could only occur through defective neurological or biological mechanisms. We understand and respect their opinions. Moreover, we do not propose that this analysis represents the only possible explanation for the occurrence of behaviors that result in the diagnosis of autism. We do not rule out the possibility that, in the future, researchers may discover specific neurological, biological or genetic factors that may contribute directly to the development of behaviors that later result in a diagnosis of autism. However, a behavioral analysis of the cause of autistic behaviors is in no way dependent upon the presumption of such factors.

Our goals are identical to those of parent advocates and other professionals who call for more effective procedures for prevention, treatment, and possible cure of autism that can be implemented immediately. Our operating assumption is that a behavioral analysis of the contingencies that may shape those behaviors upon which a diagnosis of autism is based will ultimately serve the best interests of children diagnosed with autism and their families. We believe that, in the long term, this analysis of autism as a contingency-shaped disorder of verbal behavior may contribute materially to the development of more effective behavioral programs for prevention, early intervention,

and treatment of autism that will, in the future, benefit hundreds, and perhaps thousands, of young children and their families.

The Neurobiological View of the Causes of Autism

Many contemporary theories of autism have linked its cause to as yet unidentified neurological or biological factors. In support of this position, Minshew, Sweeney, and Bauman (1997) in the *Handbook of Autism and Pervasive Developmental Disorders* (Cohen & Volkmar, 1997) stated, "Autism is now generally accepted to be a disorder of brain development and hence of neurological origin" (p.344). Similarly in the same volume Dykens and Volkmar (1997) stated, "Researchers generally agree that autism is the result of some neurobiological factor or factors" (p. 388). These popular assumptions about the causes of autism have spawned at least three national organizations devoted to discovering medical, neurological, or biological causes of autism: Cure Autism Now (CAN); Defeat Autism Now! (DAN!); Autism Research Institute, and the National Alliance for Autism Research.

Although neurobiological views of the causes of autism are intuitively appealing, medical research has failed to provide conclusive evidence for a neurological, biological, or genetic cause for autism. In the introduction to a special issue of the *Journal of Autism and Developmental Disorders* devoted to contemporary research in autism, Alexander, Cowdry, Hall, and Snow (1996) stated, "No consensus regarding causes or potential cures for autism is assumed. This is a problem that is not yet solved" (p. 118). Likewise, Bailey, Phillips, and Rutter (1996) stated, "a replicable, neurophysiological basis for autism has not yet been identified" (p. 89). More recently other neurobiological researchers have reached similar conclusions. Lauritsen, Mors, Mortensen, and Ewald (1999) stated, "Infantile autism is a heterogeneous disorder of unknown etiology" (p. 335). Trottier, Srivastava, and Walker (1998) reported, "The etiology of autism is complex, and in most cases the underlying pathologic mechanisms are unknown" (p. 103). Thus despite the prevalence of the neurobiological explanation, it is evident that no conclusive scientific evidence for a neurobiological cause for autism currently exists.

Behavioral Theories of Autism

Behavior analytic explanations of the causes of autism are numerous and diverse. These include the behavioral hypothesis of Ferster (1961), the contingency-shaped or behavioral incompatibility theory of Drash and Tudor (1993, 1999, 2000), the behavioral mismatch theory of Lovaas and Smith (1989), the social communication theory of Koegel, Valdez-Menchaca, and Koegel (1994), the stimulus control theory of Spradlin and Brady (1999), and the behavioral interference theory of Bijou and Ghezzi (1999). These behavioral theories all incorporate the view that the behaviors of children labeled as autistic can be analyzed in terms of the concepts and principles of Applied Behavior Analysis (ABA), and that these concepts and principles can produce effective treatment programs for children diagnosed with autism (Ghezzi, Williams, & Carr, 1999). However, these theories differ greatly with regard to the initiating cause of behaviors upon which a diagnosis of autism is based.

With the exception of the first two theories (Drash & Tudor, 1993, 1999, 2000; Ferster, 1961) these behavioral theories attribute the initiating cause of autism to a defective neurological or biological process that interferes with the normal developmental process. Lovaas and Smith (1989) postulate a mismatch between the normal environment and the nervous system of the child. The Koegel, Valdez-Menchaca, and Koegel (1994) theory postulates a defective neurological process that may result in inappropriate socialization and defective language development. Spradlin and Brady (1999) hypothesized that possible neurological limitations in children with autism make it more difficult to establish stimulus control. Bijou and Ghezzi (1999) postulated that young children with autism have "abnormalities in their sensory equipment" that produce a "tendency to escape and avoid tactile and mild auditory stimuli" (p. 34). This avoidance behavior then interferes with normal social and language development. These four theories can be termed *reductionistic* in that they attribute the initiating cause of autism to an hypothesized but unidentified neurobiological process. In contrast to these, only Drash and Tudor (1993, 1999, 2000) and Ferster (1961) rely on a completely behavioral analysis that attributes the early development of autistic behaviors to spe-

cific and identifiable contingencies of reinforcement in the early environment of the child.

One of the first significant behavioral analyses of autism was published by Ferster (1961). He presented a detailed analysis of how a variety of contingencies of reinforcement operating between parent and child during the early years might establish and strengthen a repertoire of behaviors typical of children diagnosed as autistic. He observed that a child's disruptive behaviors may be maintained by their effect on his parents or caregivers because they function as an aversive stimulus that can be terminated if the caregiver supplies a reinforcer. Moreover, he also observed that over time such aversive behaviors may be strengthened by continued reinforcement and become prepotent over other age-appropriate behaviors. Unfortunately, Ferster's analysis was regarded by some as a behavioral version of the discarded psychogenic theory which ascribed autism to parental personality traits. The implications of the article for research and treatment, including extensions to the communicative functions of aberrant behavior, therefore, were never fully analyzed.

In a review of the Bijou and Ghezzi (1999) analysis, Hayes (1999) cautioned that attributing psychological events to biological causes is unnecessary and is an impediment to the development of effective (behavioral) treatments since it leaves lingering doubt as to the possibility of truly successful psychological intervention. Likewise, Schlinger (1995) stated that behavioral or environmental contingencies that might account for a behavioral complex should be ruled out first before attributing the behavior to neurological, biological, or genetic causes.

CATEGORIES OF BEHAVIOR THAT REQUIRE ANALYSIS IF AUTISM IS TO BE CONCEPTUALIZED AS A CONTINGENCY-SHAPED DISORDER

The Diagnostic and Statistical Manual of Psychiatric Disorders (DSM IV; American Psychiatric Association, 1994) outlines three specific categories of behavior that are considered essential for an accurate clinical diagnosis of autism. Since there is no neurobiological or genetic test for autism, the diagnosis of autism is based entirely on observed behavior. Based on our research and that of others we have included a fourth category of behavior that we consider a central feature of autism.

In order to demonstrate that behavioral contingencies may be largely, if not completely, responsible for the behavioral complex diagnosed as autism, it is necessary to analyze how contingencies of reinforcement may establish, shape, and maintain the behaviors that comprise each of these four categories of behavior.

Qualitative Impairment in Communication as Manifested by Little or No Spoken Language

Severe language deficiency is a classic feature of autism (Churchill, 1978; Richter, 1978; Rutter, 1974, 1978). Autism in young children is rarely diagnosed in the absence of a significant deficiency in spoken language. Indeed, it is the lack of age-appropriate spoken language at age 2 to 3 years that typically initiates the entire referral, diagnostic, and treatment process. Many children diagnosed with autism at 2 to 3 years of age have little or no expressive or receptive verbal behavior, while others have minimal receptive repertoires but no expressive verbal behavior. Many 2 and 3-year-old children when first diagnosed with autism are functioning at a 9 to 12 month level of language acquisition. *Thus, serious deficiency in or lack of spoken language repertoires may be the primary and essential distinguishing characteristic of autism, since without deficiency in spoken language such children quite probably would not be diagnosed as autistic.*

Qualitative Impairment in Social Interaction Including Marked Social Isolation and Impairment in Peer Relationships

Social isolation and delay in age-appropriate social behavior is a second major category of behavior typical of children with autism. Almost all children diagnosed with autism have some deficits or impairment in their social repertoires. Behaviors in this category include social isolation and aloneness, avoidance of eye-contact, lack of age-appropriate social play, lack of responsiveness to other persons, and lack of age-appropriate social-interactional skills.

Markedly Restricted, Repetitive, and Stereotyped Patterns of Behavior, and Limited Responsiveness to Environmental Stimuli

This category includes behaviors such as stereotyped body movements, hand flapping, persistent preoccupation with specific parts of objects, emotional responses to inconsequential alterations in trivial aspects of the environment, unreasonable insistence on following specified routines in precise detail, preoccupation with specific responses, such as smelling or spinning objects. The range and variety of environmental stimuli that function as reinforcers is also markedly restricted.

Moderate to Severe Disruptive Behaviors, Task-Avoidance, and Noncompliance

Disruptive behaviors, task-avoidance, and noncompliance are not specified as distinct diagnostic criteria for autism in the DSM IV. However, we view these behaviors as both typical and critical components in most cases of autism. Moreover, in his original papers on autism, Kanner listed a variety of disruptive behaviors including temper tantrums, aggressiveness, and destructiveness as characteristic of children with autism (Frith, 1991). There is also overwhelming evidence in the research literature on autism that documents that challenging behaviors are highly typical of children labeled as autistic (Carr & Durand, 1985, 1986; Charlop-Christy & Kelso, 1997; Durand, 1999; Iwata, Dorsey, Slifer, Bauman, & Richman, 1994; Leaf & McEachin, 1999; Lovaas, 1993; Repp, & Singh, 1990). Typical behaviors in this category include crying, screaming, temper tantrums, head-banging, kicking, biting, task-avoidance, non-responsiveness, noncompliance, aggressive behavior, self-stimulatory behavior, and self-injurious behavior.

HOW CONTINGENCIES OF REINFORCEMENT
MAY OPERATE TO ESTABLISH AND SHAPE THE
BEHAVIORS THAT SUBSEQUENTLY RESULT IN A
DIAGNOSIS OF AUTISM

In summarizing their interference theory of autism, Bijou and Ghezzi (1999) concluded, "... most of the abnormal behaviors of children with autism serve to compensate for their deficiencies in social-emotional and verbal behavior" (pp. 39–40). Based on their analysis, deficiencies in social-emotional behavior and verbal behavior are *alone* sufficient to account for most of the behaviors that are observed in chil-

dren labeled as autistic. While agreeing with much of their analysis, we differ substantially in at least three respects.

First, we view autism *primarily* as a contingency-shaped disorder of verbal behavior that often coexists with a repertoire of avoidance and other disruptive behaviors. In order to analyze the causes of autism, it is first necessary to analyze the causes of deficiency in verbal behavior. As will be discussed below, the social-emotional deficits of children with autism can be causally linked by a behavioral analysis to the deficiencies in verbal behavior and the presence of disruptive avoidance behaviors.

Second, we view the presence of inappropriate verbal behavior, that is, aversive vocal manding (e.g., screaming, crying or whining) in combination with avoidance and other disruptive behaviors, rather than age-appropriate verbal behavior (such as, pre-speech vocal sounds, words, phrases, etc.) as *primary* causal factors contributing to the shaping and maintenance of other behaviors on which a diagnosis of autism is based. Both experimental and clinical evidence details how repertoires of aversive vocal manding and other disruptive avoidance behaviors can be shaped by reinforcement contingencies, and once established, are incompatible with the acquisition of functional verbal behavior (Drash, 1993; Drash, High, & Tudor, 1999; Drash & Tudor, 1993; Richter, 1978). Moreover, since many of these more aversive behaviors terminate parent-child interactions, they may also prevent or inhibit the establishment of social-emotional bonding and other social behaviors. These two repertoires, aversive vocal manding and other disruptive behaviors, may thus be responsible for most of the other behavioral symptoms of autism.

Third, absence of age-appropriate verbal behavior and the presence of avoidance behavior can be explained as a result of contingencies of reinforcement operating during the first to third year of a child's life, especially during the first 12 to 18 months. A behavioral analysis of those contingencies explains the development or lack of development of verbal behavior and the presence of disruptive and avoidance behavior without relying on hypothetical neurological variables to explain their occurrence.

The fact that there may be subsets of children diagnosed as autistic with accompanying

neurological, biological, or genetic abnormalities is not disputed. This would not be incompatible with our contingency-shaped theory. Since the diagnosis of autism is based entirely on a continuum of observed behaviors, i.e., "autism spectrum disorders" (Wetherby & Prizant, 2000), the diagnosis will, on occasion, almost inevitably include subsets of atypical children, who in addition to their principal disorder, such as Down syndrome, Fragile X syndrome, or Rett's disorder, may also display behaviors that are typical of children diagnosed as autistic. In other cases, children diagnosed with autism may later be found to have seizures, brain tumors, or other physiological problems which may have contributed to the development of autistic behaviors.

BASIC PREMISES OF A BEHAVIORAL ANALYSIS OF AUTISM AS A CONTINGENCY-SHAPED DISORDER OF VERBAL BEHAVIOR

To analyze autism as a contingency-shaped disorder of verbal behavior it is necessary to provide a conceptual analysis showing how reinforcement contingencies may establish and maintain a repertoire of deficient verbal behavior and disruptive avoidance behaviors during the first one to two years of life.

The purpose of this paper is to present a conceptual analysis that extends well established behavioral principles to an analysis of the etiology of behaviors that are later diagnosed as autistic. All of the terms of this analysis refer to potentially modifiable conditions in the child's environment and directly observable and measurable aspects of his performance. Moreover, experimental evidence supports each of the basic premises of this analysis. There are at least four major premises upon which this analysis is based. In summary, these are: 1) The acquisition of verbal behavior, *or the lack thereof*, by children labeled as autistic is primarily a function of reinforcement contingencies provided by caregivers and others during the first years of a child's life. 2) Caregivers and others may inadvertently shape repertoires of disruptive and avoidance behaviors in their infants and young children during the first one to three years of a child's life. 3) Disruptive and task-avoidance responses are frequently present in young children diagnosed with autism, or PDD. 4) When present, disruptive behaviors may become incompatible

with and may prevent the acquisition of age-appropriate verbal behavior, as well as other social behaviors.

The first question is whether and to what degree contingencies of reinforcement provided by caregivers and others may facilitate or impede the language acquisition of their children. Empirical support for the concept that parents strongly influence the language acquisition of their children from infancy forward is provided by the longitudinal research of Hart and Risley (1995, 1999) on language development in children from 7 months to 3 years. Their research shows that the frequency and complexity, *or lack thereof*, of the child's verbal behavior at age 3 years is directly related to the frequency and complexity of verbal behavior that occurs between parents and their children from the first year of life forward. When the hourly frequency of talk between parent and child was high, the children developed large vocabularies and spoke in complex sentences by age three. When the hourly frequency of talk between parent and child was low, children developed much smaller vocabularies and spoke in much less complex sentences. This finding suggests that if there is very little or no interactive talk between parent and child during the first year to three years, the child's verbal behavior may be deficient at three years.

In keeping with our premise that acquisition of verbal behavior is a function of contingencies of reinforcement, Hart and Risley (1999) concluded, "We propose that language development is governed by the same natural laws as motor, social, and cognitive development" (p. 199).

The second question is whether caregivers and others, during the first year of a child's life, may unintentionally shape disruptive infant response repertoires. In a series of experimental studies of emotional behavior of infants, ages 6 to 12 months, and their parents, Gewirtz and Pelaez-Nogueras (1991, 1999) demonstrated that disruptive infant behaviors, such as crying, whining, and screaming, can be inadvertently shaped by parents during the first year of life. Moreover, the parent-infant contingencies that shape the disruptive behaviors can be identified and modified as early as 6 to 9 months of age. In discussing how disruptive infant behaviors may be shaped, they concluded, "The infant adaptive problem behaviors actually

appear to be operants under the control of occasioning stimuli and consequences inadvertently provided ... by the responding of well-intentioned, loving parents" (1999, p. 272). Thus, without intending to do so, parents may shape disruptive behaviors during the first year of life which may interfere with the acquisition of more adaptive responses.

The third question is whether disruptive and task-avoidance responses are frequently present in young children diagnosed with autism or PDD. We have previously shown that aversive manding and other disruptive avoidance behaviors are frequently present in young children diagnosed with autism or PDD. An analysis of all cases (N = 48) admitted during 1992 and 1993 with a diagnosis of autism or PDD, revealed that in 41 of the 48 cases, or in 85% of the cases, disruptive or task-avoidance behavior was present and was a major factor interfering with acquisition of verbal behavior (Drash, 1993).

The final question is whether it is possible for aversive manding and other disruptive behaviors, when present, to prevent the acquisition of verbal behavior. We have shown that aversive manding and other avoidance behaviors when present may be incompatible with the acquisition of age-appropriate verbal behavior. It is only after inappropriate verbal behavior and other disruptive behaviors are greatly reduced or eliminated by providing reinforcement only for acceptable vocal mands (that is, extinction combined with differential reinforcement of acceptable vocal mands), that shaping of appropriate vocal mands can proceed. (Drash, High, & Tudor, 1999).

The contingency-shaped theory of autism is based entirely on behaviors that are readily observable, measurable, and modifiable, and the analysis is thus subject to further experimental analysis and verification.

WHEN DO CONTINGENCIES OF REINFORCEMENT BEGIN TO SHAPE THE BEHAVIORS THAT ARE LATER DIAGNOSED AS AUTISTIC?

Until recently the diagnosis of autism was rarely made before a child was 2 to 3 years of age. Despite this, accumulating evidence suggests that many parents have expressed concern to their pediatrician about their child's language and social delay by 18 months of age (Siegal, Pliner, Eschler, & Elliot, 1988). Other

research reported that 50% of parents of a child diagnosed as autistic suspected a problem before their child was 1 year old (Ornitz, Guthrie, & Farley, 1977). Barton-Cohen, Allen, and Gillberg (1992) demonstrated that behaviors that are correlated with a later diagnosis of autism can be accurately identified at 18 months. More recent research has shown that behavioral correlates of a later diagnosis of autism can be identified as early as 8 months (Werner, Dawson, Osterling, & Dinno, 2000) to 12 months (Osterling & Dawson, 1994).

The fact that behaviors correlated with a later diagnosis of autism can be detected as early as 8 to 12 months, in combination with parental awareness and concern over developmental problems before a child is 12 months old, suggests that the contingencies producing language and social delays are in all likelihood operating during the first year of life, and quite possibly as early as 6 to 8 months, if not earlier. Therefore, a behavioral analysis should focus on pinpointing those caregiver-infant interactions that may establish and reinforce aversive vocal mands and other disruptive and avoidance behaviors that occur during the first year of life and that may later result in a diagnosis of autism. The contingencies and resulting behaviors, to be described below, in all likelihood, have their origins during the first year and are then further shaped, refined, and strengthened as the child develops.

THE RELATIONSHIP BETWEEN MANDING AND VERBAL DELAY IN YOUNG CHILDREN LABELED AS AUTISTIC

Skinner's (1957) analysis of verbal behavior is particularly relevant to analyzing verbal deficiency in young children labeled as autistic. Skinner's analysis indicates that verbal behavior is acquired primarily because it produces reinforcement through the mediation of other persons. Skinner's (1957) identification of the mand as the first verbal operant to be acquired is particularly critical to our analysis. If during the first year to three years of life an infant is given all the essential, life sustaining reinforcement and nurture without a requirement for age-appropriate vocal manding, then it is quite possible that verbal behavior may not develop. A detailed description of how Skinner's analysis of verbal behavior can be applied to the analysis and treatment of verbal

behavior in children diagnosed as autistic is provided by Sundberg and Michael (2001) and Sundberg and Partington (1998).

REINFORCEMENT PARADIGMS THAT MAY CONTRIBUTE TO THE DEVELOPMENT OF DEFICIENT VERBAL REPERTOIRES IN CHILDREN WITH AUTISM

In a previous publication we presented an analysis of reinforcement contingencies that may contribute to language delay in young pre-school children (Drash & Tudor, 1990, 1993). Our research has demonstrated that a similar analysis applies equally well to language delay in young children with autism (Drash, High, & Tudor, 1999; Drash & Tudor, 1999, 2000).

There are at least six reinforcement paradigms that may contribute to significant deficiency in verbal behavior that we have identified and analyzed in our verbal behavior research with children labeled as autistic over the past thirty years. The observations upon which these analyses are based represent multiple replications of within-subject studies in which the contingencies preventing acquisition of verbal behavior were repeatedly identified and analyzed, and then systematically replaced with contingencies that produced age-appropriate verbal behavior. Our standard data collection system for continuous recording and analysis of verbal behavior during the shaping of verbal behavior has been previously described (Drash & Tudor, 1991). This data recording system allowed us to meet the requirements for drawing valid inferences from within-subject case studies, replicated across multiple subjects, as discussed by Kazdin (1982).

Each of these six reinforcement paradigms may contribute to the establishment of a repertoire of behavior that is incompatible with the acquisition of age-appropriate verbal behavior. Several of these paradigms may concurrently create a repertoire of avoidance responses.

1. Reinforcement for Aversive Vocal Manding, such as Crying or Screaming, or Other Avoidance Behaviors that May Be Incompatible with Acquiring Age-Appropriate Verbal Behavior

Manding is the first type of verbal behavior emitted by infants (Drash, High, & Tudor, 1999; Drash & Tudor, 1993; Schlinger, 1995;

Skinner, 1957). The first cries of an infant are respondent in nature and gradually come under operant control as vocal mands when a caregiver responds to these cries. In most instances, the infant's cries and screams are transformed into more acceptable verbal behavior through the parent's subtle shaping and a variety of prohibitions against screaming, crying or fussing (Bruner, 1983; Hart & Risley, 1995; Schlinger, 1999). Conversely, if caregivers inadvertently provide reinforcement for crying, fussing, or screaming to the exclusion of requiring age-appropriate vocal mands, a strong repertoire of aversive vocal manding may be established (Ferster, 1961). For example, if the parent has heard the infant produce the sound, "bababa" on multiple occasions, the parent may prompt the child to say "baba" for bottle by presenting the bottle with the verbal prompt, "Say, bababa." However, if the child has been without food for some time, the response might be a cry or scream, the response that in the past has been reinforced. To *escape* the aversive crying of the infant, the parent may quickly present the bottle without first requiring an echoic response to the prompt. The infant's likelihood of crying in response to future prompts for vocal behavior will have been further strengthened. Over a longer period of time the caregiver may completely avoid the aversive cries of the infant by providing food, milk, and other reinforcers without first requiring appropriate vocal responses. The aversive vocal manding of the child can interfere with and ultimately terminate the parents' language teaching efforts and thereby prevent the acquisition of age-appropriate verbal behavior.

After the contingencies have shaped a strong repertoire of aversive vocal manding, stimulus control over these responses will be present. The child will show an increased tendency to emit aversive vocal mands and other avoidance behaviors in situations similar to those that were previously reinforced. For example, the child might pull the parent to the refrigerator and wait to be given juice or milk. If the parent attempts to require that the child first say "juice" or "milk," the child may cry or scream until given the juice. The teaching efforts are thus terminated, and aversive manding is further strengthened.

The majority of young children in our research and clinical programs have had behavioral repertoires that reflect the influence of this

paradigm. An analysis of all cases ($N = 48$) admitted for treatment with a diagnosis of autism or PDD during 1992–1993 revealed that 85% had disruptive or task-avoidance behavior that interfered with acquisition of age-appropriate verbal behavior (Drash, 1993). Typical of children in this category is a 3 1/2-year-old child referred for treatment because of severe language delay. The initial evaluation showed that the child produced no words or other age-appropriate verbal behavior, and he emitted severe oppositional behavior. During the initial evaluation he screamed loudly when prompted to produce a word or sound. Twenty-seven percent of his initial responses were either screams or task-refusals. The mother reported that at home whenever she prompted the child to produce a word or sound, the child screamed until she ceased prompting him for vocal behavior.

A second child, who was first diagnosed as at-risk for autism at 15 months of age, engaged in similar behaviors. When evaluated by us at 3 years of age, he had no expressive verbal behavior, and his mother reported that he only communicated by screaming. Fifty percent of his baseline responses were either screams or task-refusals. Temper tantrums were his predominant response when he did not immediately obtain a reinforcer. During the initial interview he began violently kicking his mother. She reported that his tantrums often consisted of pinching, kicking, scratching, biting, and head-butting. A speech therapist who began therapy with the child at 18 months discontinued structured therapy as a result of these disruptive behaviors.

As demonstrated by both cases, a single vocalization, the aversive vocal mand, a cry or scream, functioned as a *generic, all-purpose mand* that the child emitted to obtain reinforcement or to escape or avoid aversive stimuli. The aversiveness of the child's behavior discouraged parental attempts to teach more appropriate verbal behavior.

There are other vocal behaviors that, while not as aversive, are functionally equivalent to aversive manding in that they are incompatible with and prevent the acquisition of age-appropriate vocal behaviors. In one instance, a 2 1/2-year-old child with a diagnosis of aphasia was referred for the treatment of language delay. Although the child had no age-appropriate expressive verbal behavior, he could pro-

duce a variety of vocal sounds. But when prompted to produce an echoic response, he primarily emitted one sound, "eee." The parents were originally amused by this response and inadvertently reinforced it, but they soon realized that the child vocalized few other sounds. The predominance of the single sound "eee" prevented the parents from teaching the child age-appropriate vocal behavior. It was only after this single sound was replaced with other more appropriate vocal mands through verbal behavior therapy that the child began to acquire age-appropriate verbal behavior.

After a repertoire of aversive or competing vocal mands is established, it can be extremely resistant to modification. In each of the above cases, a repertoire of aversive manding or other incompatible vocal behaviors effectively prevented acquisition of a repertoire of age-appropriate vocal mands. In addition, these aversive behaviors may also prevent or inhibit the establishment of social-emotional bonding and other social behaviors. For a further discussion of this reinforcement paradigm see Malott, Malott and Trojan (2000, pp. 295–298).

2. Reinforcement for Gestural Manding and Other Nonvocal Forms of Manding

This category includes behaviors such as looking at, reaching toward, pointing to, standing next to, or pulling the caregiver toward the desired item. During our standard clinical interview we routinely ask parents of children labeled as autistic the following question, "Since your child cannot talk, how do you know what he or she needs or wants?" The most frequent response is that their child looks at, reaches toward, or pulls them to the desired object. Caregivers routinely reinforce and strengthen a repertoire of *nonvocal gestural manding* by supplying reinforcing stimuli without first setting a contingency for acceptable vocal mands (Drash, High, & Tudor, 1999). If the reinforcing stimulus item is not immediately forthcoming, the child may respond with crying or screaming until the parent presents the reinforcer. If the parents believe that their child is unable to speak, they may immediately provide a reinforcer, *thus combining the effects of paradigms one and two*. If nonvocal gestural manding continues to be reinforced until a child is three to four years, it will become deeply ingrained and pervasive in the child's

repertoire. This nonvocal repertoire becomes the child's primary mode of obtaining reinforcement, thereby preventing the acquisition of age-appropriate verbal behavior.

3. Anticipating the Child's Needs and Thus Reinforcing a Repertoire of Nonresponding that Prevents both Vocal and Nonvocal Mands

Although similar in some respects to paradigm number two, a significant difference exists. In this paradigm, caregivers anticipate the child's "needs and wants" and *deliver reinforcement noncontingently before the child mands either vocally or gesturally*. This paradigm may over time establish a repertoire of very low rate behavior in which the child simply waits passively for reinforcement without any form of manding, either vocal or gestural. Therapeutic attempts to prompt vocal behavior often produce temper tantrums or other forms of task-avoidance.

Several parents reported that they anticipated their child's needs to prevent their child from becoming "frustrated." For example, the parents of a 2 1/2-year-old nonverbal child reported that they anticipated all their child's needs and never required him to speak. They were unaware that by providing noncontingent reinforcement they were strengthening a repertoire of nonresponding.

Over time this paradigm may produce a silent or passive child who "appears to have little or no interest in the environment," a characteristic typical of many children labeled autistic.

4. Extinction of Verbal Behavior

This paradigm is in effect whenever an infant is in an environment in which parents or other caregivers do not actively prompt, respond to, and reinforce the child's vocal utterances. Such environments may occur more frequently than is generally recognized. In today's culture it is likely that both parents (or the single parent) will be working and will leave the child in a day-care center or in the care of a relative, a baby sitter, or a nanny.

Although the staff of many day-care centers may provide excellent physical care for young infants and toddlers, the staff may not have sufficient time or expertise to provide consistent and ongoing reinforcement on a moment

to moment basis for the verbal behavior of each individual infant. Hart and Risley (1995) stated, "Quality out-of-home care can be provided for infants and young children, even though it rarely is" (p. 207), moreover, "the most important aspect to evaluate in child care settings for very young children is the amount of talk actually going on moment to moment, between children and their caregivers" (p. xxi).

Extinction of verbal behavior may also occur at home when an infant is cared for by relatives, a baby sitter, or a nanny. The research of Hart and Risley (1995) indicates that the essential element in language delay appears to be, "How frequently does the caregiver talk with the child each hour?" If there is little or no talk between caregiver and infant each hour during the hours of care, the verbal behavior of the child may be on extinction. In one case, the parents, both of whom worked long hours, left the child at home in the care of a non-English speaking nanny. The nanny was specifically instructed not to speak to the child in her native language. The child developed no language and was diagnosed with PDD at age 2 years. It is, of course, impossible to draw a causal relationship without knowledge of the major verbal and other contingencies that may have been in effect during the two-year period (e.g., How much did the parents talk to the child when they were at home in the evenings and weekends? Did the nanny acquire some English and begin to speak to the child during the two year period?) This case, however, illustrates how it might be possible for extinction to operate in a seemingly normal home environment if a high hourly rate of conversation between caregiver and child does not occur.

Relatively few children who spend time in alternative placements will be seriously language delayed, and even fewer will be diagnosed with autism or PDD. However, as Hart and Risley (1995, 1999) have shown, degree of language delay is relative and is directly related to the frequency of talk between parent and child that infants and children receive during the first three years of life.

Other environmental events that may disrupt or reduce the frequency of reinforcement for verbal behavior or place it on extinction during the critical first two years of life have been discussed by Fowler (1990). Some of these include prolonged physical or emotional illness of one or both parents, death of a parent, moving to a new residence, increased work de-

mands on the time of one or both parents, and placing the child with a new caregiver or nanny. Extinction of verbal behavior might also occur when children are allowed to sleep or remain isolated in their crib without adult interaction for inordinate amounts of time each day over an extended period of weeks or months.

5. Interaction between Organic or Presumed Organic Factors and Behavioral Factors

Certain physical disabilities such as hearing loss, chronic ear infections, or prolonged illness, especially when occurring during the first two years of life, can directly interfere with the establishment of verbal behavior (Bijou, 1966, 1983). Other physical disabilities may have no direct effect on a child's ability to produce verbal behavior. However, it is the reaction of the parents or caregivers to the disability or *presumed disability* that may function to reduce subsequent requirements for verbal behavior due to a fear of precipitating additional problems. In one case, the parents of a 2 1/2-year-old child who was later diagnosed with autism, believed their child had chronic ear infections because he screamed and covered his ears whenever they spoke to him. They discontinued their efforts to teach language because they believed it caused him pain. In another case, the parents of a 3-year-old verbally delayed, asthmatic child decreased their attempts to teach language for fear of precipitating an asthmatic attack (Drash & Tudor, 1989).

6. Non-Suppression of Disruptive Behavior and Failure to Establish Early Verbal Instructional Control and Compliance

In contrast to the first five paradigms that detail how reinforcement contingencies may operate to create specific behavioral repertoires consistent with a diagnosis of autism, *this section describes the absence of specific caregiver behaviors* that may contribute to the establishment of disruptive behaviors typically observed in children labeled autistic. From birth to three years of age many typical children engage in a variety of behaviors designated as disruptive, oppositional, defiant, or noncompliant (i.e., "the terrible twos"). During these years most parents attempt to reduce or eliminate those behaviors and strengthen socially acceptable responses.

In the case of children diagnosed with autism, the elimination of disruptive and noncompliant behavior is even more critical. As stated by Charlop-Cristy and Kelso (1997), "The rationale behind compliance training is simple—if the child does not comply, then he will not learn! Compliance plays a vital role in every aspect of the learning situation" (p. 53).

Parents and caregivers of children labeled as autistic often demonstrate lack of control over the disruptive and noncompliant behaviors of their children. Such behaviors may include screaming, severe temper tantrums, kicking, hitting, biting, throwing objects, jumping on furniture, damaging property, and running about uncontrollably. These behaviors are quite functional for the child in at least two ways. First, they allow the child to obtain reinforcement, for example, by screaming until he is given a specific toy, food, or other reinforcer, and second, they allow the child to avoid or escape compliance with parental or caregiver demands or requests. Parents often report that they believe these behaviors are an integral component of their child's disability, and that their child is unable to control the behavior. Parents often do not provide the consequences necessary to reduce or eliminate these behaviors, believing that doing so might cause additional problems. (See also Paradigm 5 above.)

In some cases the non-confrontative behavior of parents may have been shaped over a period of months or years by the aversive contingencies of the child's behavior. After many unsuccessful attempts to reduce or eliminate disruptive and noncompliant behaviors, parents may simply discontinue attempting to discipline the child as they might a typical child. These disruptive and oppositional behaviors become increasingly more severe and difficult to manage as the child becomes older and stronger.

In one extreme but illustrative case, a 2-year-old child was referred for failure to develop language. The parent's main concern, surprisingly, was not the child's language delay, but rather the child's severe temper tantrums and aggressive behavior. The mother reported that she was forced to carry him wherever she went. When she attempted to put the child down, he screamed and attacked her viciously by biting, pinching, hitting, and pulling her hair until she picked him up and cuddled him, thus further reinforcing the aggressive behavior. The

mother was adamant that these behaviors were part of his disability and could not bring herself to discipline him.

HOW THE PRESENCE OF DISRUPTIVE AND AVOIDANT RESPONSES AND THE LACK OF VERBAL BEHAVIOR MAY CONTRIBUTE TO DEFICIENCIES IN SOCIAL-EMOTIONAL DEVELOPMENT

During the first two years of a child's life, parents provide the vast majority of stimulation, teaching, and reinforcement necessary for children to acquire verbal behavior, social bonding, and a variety of social skills (Hart & Risley, 1995, 1999). During the first year, typical infants receive ongoing informal training in social and pre-language skills from their parents or caregivers on a daily basis (Bruner, 1983). Parents routinely reinforce a variety of social and pre-language behaviors including eye-contact, responding to name, kissing, hugging, babbling, cooing, clapping, singing, smiling, laughing, looking at books, pointing to pictures and objects, playing interactive games, and following simple instructions. In so doing a repertoire of receptive language (i.e., verbal instructional control and compliance) is being established, and the child's behavior is being brought under the stimulus control of verbal behavior (i.e., "Show me your nose, eyes, ears," "Touch the apple," "Give me the ball," "Where is your bottle, teddy bear?" etc.) Consequently, by 18 to 24 months the typical toddler has developed an extensive and relatively complex repertoire of social behaviors, a relatively large receptive vocabulary, is coming under the stimulus control of verbal behavior, and is beginning to develop expressive verbal behavior.

However, if during the critical first 12 to 18 months, negative manding and disruptive avoidance responses are reinforced and strengthened, this predominant response repertoire may become incompatible with the development of interactive parent-child social behaviors. Consequently when parents attempt to teach social and pre-language behaviors, pre-established patterns of aversive manding and disruptive avoidance behavior may function to decrease the time parents spend teaching their child. This may ultimately produce large deficits in social-emotional and pre-language behaviors normally established during the first two years of life, and the child may begin in-

creasingly to avoid interactions with adults and other children.

If pervasive extinction, as described in Paradigm 4, is in effect rather than aversive manding, then, by definition, limited teaching opportunities will have occurred, and very few age-appropriate social behaviors will have been established. Extinction may ultimately produce a child whose behavior is relatively unresponsive to human interaction.

Once deficits in the social-emotional repertoire occur, either through extinction or avoidance, it becomes increasingly difficult to engage the child in effective teaching interactions. Parental time that might ordinarily be spent teaching language and social behaviors, as well as in establishing novel conditioned reinforcers, may be directed toward avoiding interactions that occasion disruptive or avoidance behavior. This is illustrated by the example of the 2-year-old described in Paradigm 6. The child's disruptive behaviors were so severe that whenever the mother attempted to engage him in a teaching interaction, he immediately began screaming and pulling her hair. The mother consequently terminated her attempts to teach the child.

HOW CONTINGENCIES MAY CONCURRENTLY SHAPE RESTRICTED, REPETITIVE, AND STEREOTYPED RESPONSE REPERTOIRES

Children who have not acquired age-appropriate verbal behavior and social repertoires by 2 years of age are necessarily restricted to a very limited set of responses typical of pre-linguistic infants and children. These are primarily cause-and-effect activities that provide automatically reinforcing sensory stimulation. Typical behaviors include thumb-sucking, mouthing and banging objects, finger flicking, hand flapping, spinning objects, inspecting specific aspects of toys, or rubbing the surface of objects. As the child grows older many of these behaviors may come under the control of other environmental contingencies. For example, an automatically reinforcing behavior such as pressing one's eye, may be unintentionally reinforced and shaped into a more serious self-injurious behavior by the attempts of caregivers to prevent the behavior. In addition to automatic reinforcement, research has shown that self-injurious, repetitive, and perseverative behaviors may be reinforced and

maintained by positive reinforcement or by avoiding or escaping aversive contingencies (Durand, 1999; Iwata, Dorsey, Slifer, Bauman, & Richman, 1994).

Since the development in young children of conditioned social reinforcers, such as playing ball, tag, or hide and seek, is dependent in large measure on verbal behavior and verbal instructional control, a lack of verbal behavior necessarily restricts the child's repertoire to those repetitive and stereotyped behaviors typically associated with younger children.

ADVANTAGES OF CONCEPTUALIZING AUTISM AS A CONTINGENCY-SHAPED DISORDER OF VERBAL BEHAVIOR

Conceptualizing autism as a contingency-shaped disorder of verbal behavior represents a significant departure from the contemporary neurobiological theories of its etiology and provides a new paradigm (Kuhn, 1966) for behavioral research in autism. It is relevant to ask what changes may result from this conceptualization and whether these changes may represent a substantial improvement over the current approaches to prevention, early intervention, and treatment of autism. A number of the potential changes and concomitant advantages that might result from this conceptualization are discussed below.

Conceptualizing Autism as a Contingency-Shaped Disorder of Verbal Behavior Creates a New Paradigm for Behavioral Research and Treatment in Autism

Since autism has previously been viewed primarily as a neurobiological disorder, there has been little incentive for behavioral researchers in the field of autism to conduct experimental analyses of the contingencies of reinforcement that exist between parent and child from birth to one year, especially as those contingencies relate to the shaping of verbal behavior. Moreover, there have been and continue to be significant "politically correct" pressures, both from within and outside the profession, that have strongly mitigated against conducting research that might implicate contingencies of reinforcement between parents and children as significant factors in the etiology of autism. However, when autism is viewed, not as a neurobiological disability or a disease entity, but as a con-

tingency-shaped disorder of verbal behavior, identifying the specific contingencies that may prevent or hinder acquisition of verbal behavior becomes a first priority for behavioral research with the objective of prevention and *earlier intervention*.

There are at least two lines of research that may be immediately productive in evaluating the effects of reinforcement contingencies in the shaping of behaviors that may later result in the diagnosis of autism. Behaviors correlated with a later diagnosis of autism can be identified at least as early as 8 to 10 months, and perhaps earlier (Werner, Dawson, Osterling, & Dinno, 2000). Consequently, behavioral research focusing on specific parent-child reinforcement contingencies that establish the initial stages of verbal behavior between birth and 12 months would be particularly useful in showing how the precursors of verbal behavior are shaped and precisely what behaviors may be incompatible with or prevent the acquisition of verbal behavior. Further analysis of the role of automatic reinforcement as it relates to the shaping of verbal behavior during the first year would also be quite valuable (Bijou & Baer, 1965; Skinner, 1957; Smith, Michael, & Sundberg, 1996; Sundberg & Michael, 2001; Sundberg, Michael, Partington, & Sundberg, 1996).

A second related line of research would be to investigate the role of aversive manding and other avoidance behaviors in preventing the acquisition of verbal behavior. Since avoidance behaviors and aversive manding are strongly implicated as causal factors in this analysis of language delay, it would be important to examine the early stages of language acquisition to evaluate precisely how aversive manding and disruptive avoidance behaviors are originally established and how these behaviors may function to prevent acquisition of appropriate verbal and social behavior. It would also be useful to analyze why and how avoidance behaviors are shaped in some children and not others.

Preventing Autism Now: A Practical Behavioral Strategy that Can Be Implemented Immediately

One of the major goals of both behavioral and biomedical research in autism during recent years has been to identify causal variables

that might lead to comprehensive programs for the prevention or cure of autism that could be implemented immediately (i.e. Cure Autism Now [CAN]; Defeat Autism Now! [DAN!]). This goal also has been strongly supported by parent advocacy groups nationwide (Grossman & Beck, 2002; Jacobson, 2000; Maurice, 1996, 2001; Perry, 2001).

This analysis of autism as a contingency-shaped disorder of verbal behavior provides Behavior Analysts with the unique ability to answer one of the most long-standing and challenging questions of parents and parent advocates nationwide: "How can autism be prevented?" Based on the current analysis, it should be possible to begin to prevent many cases of autism immediately by identifying reinforcement contingencies that might prevent or inhibit the development of verbal behavior during the period between birth and 18 to 24 months and replacing them with reinforcement contingencies that could establish age-appropriate verbal and social behavior.

One important component of ABA prevention programs would be to establish, as soon as feasible, a nation-wide network of Applied Behavior Analysis screening programs for parents and their infants between birth and 24 months that would focus on identifying and modifying contingencies and behaviors that may interfere with acquisition of age-appropriate verbal behavior. Once these contingencies are identified, parents could be taught to replace them with contingencies that will shape age-appropriate verbal and social behavior by age 2 to 3 years. In those cases in which complete prevention might not occur, prevention efforts could lead directly into ABA early intervention programs. For a related discussion of behavioral prevention programs, see Drash and Tudor (1990, 1993).

Based upon the success of previous prevention and early intervention programs, there is a high probability that the more severe symptoms of autism might never occur (Anderson, Avery, DiPietro, Edwards, & Christian, 1987; Begab, Haywood, & Garber, 1981; Bijou, 1983; Birnbrauer & Leach, 1993; Drash, 1992; Drash & Raver, 1987; Drash, Raver & Murrin, 1987; Fenske, Zalski, Krantz, & McClannahan, 1985; Garber, 1988; Guralnick, 1997; Harris, Handleman, Gordon, Kristoff, & Fuentes, 1991; Lovaas, 1987; Menolascino & Stark, 1988; Smith, Groen, & Wynn, 2000).

Developing a Contingency-based Strategy for Earlier Intervention

One of the principal goals of contingency-based early intervention programs would be to begin ABA intervention programs before the repertoires of aversive manding and disruptive avoidance behaviors are well established. As shown by several of the cases presented previously, the disruptive and avoidance behaviors of children diagnosed with autism/PDD are often well established by 18 months to two years.

If behavioral interventions that are focused on the development of appropriate verbal and social behavior and elimination of disruptive and avoidance behaviors are begun during the first year to 18 months, the probability for total recovery may be greatly enhanced. Green, Brennan, and Fein (2002) recently reported on a case in which early intensive behavioral treatment of a 1-year-old child at high-risk for autism produced total recovery within a period of three years. This study demonstrated the effectiveness of ABA intervention for autism at a younger age than has been previously reported.

Reducing the Number of Treatment Hours per Week and the Total Length of Treatment

Since the degree of pre-language or language delay is necessarily small at age 6 to 18 months and the incompatible avoidance behaviors usually are not well established, it should be possible to restore young children to "relatively normal functioning" much more rapidly than older children who have well established repertoires of disruptive and avoidance behaviors. The Lovaas (1987) program required 2 to 3 years of 40-hours-per-week intensive individual ABA treatment to achieve recovery when children began treatment at an average age of three years. Therefore, if ABA treatment is begun between 6 and 18 months, it should be possible to restore a child to relatively normal functioning within one to two years.

Our research with children diagnosed as autistic, PDD, or at-risk in the age range of 18 months to 2 1/2 years suggests that, for some children, a program of far less intensity than a 40-hour-per-week program may be sufficient to produce substantial recovery within one to two years. In one previously published case, a 19-month-old, seriously language-delayed

child, diagnosed as at-risk, achieved relatively normal language and behavioral functioning after 10 months of in-office, ABA verbal behavior therapy consisting of a total of only 52 one-hour sessions (1 to 2 sessions per week) (Drash & Tudor, 1989, pp. 30–31; 1990, pp. 199–201). In a second case, a 2 1/2-year-old nonverbal child, diagnosed with aphasia, achieved relatively normal language and behavioral functioning after 11 months of in-office, ABA verbal behavior therapy consisting of 36 one-hour sessions (1 to 2 sessions per week) (Drash, 2001).

The total number of therapy hours provided to each of these two children was only a fraction of that typically provided in a 40-hour-per-week, in-home ABA program over a comparable duration. For the first child, the comparison is 52 hours vs. 1,600 hours, or 3%, and for the second child 36 hours vs. 1,760 hours, or 2%. At present these two cases clearly represent the exception rather than the rule. However, they suggest that, in some cases, both the length and intensity of treatment for younger children, especially those considered at-risk, may be considerably less than that required for older children.

Making "Functional Recovery" a Routine and Expected Outcome in ABA Treatment of Young Children with Autism

As a result of recent advances in the field of Applied Behavior Analysis, relatively total recovery or cure is now recognized as a legitimate and obtainable outcome in the behavioral treatment of autism (Maurice, 1993; Maurice, Green, & Foxx, 2001; Maurice, Green, & Luce, 1996; McEachin, Smith, & Lovaas, 1993; Lovaas, 1987). At present, however, total recovery as an outcome remains the exception rather than the rule in the treatment of autism. Moreover, some career experts in autism continue to maintain that total recovery is impossible (Mesibov, 1997) and appear unwilling to consider evidence that indicates children have totally recovered.

The dispute over the term "total recovery" greatly detracts from the fact that hundreds of children are daily making excellent progress in ABA treatment programs, and many are, for all practical purposes, substantially recovering from autism (Maurice, 2001). To avoid the controversy surrounding the term "total recovery,"

ery" we propose the term "functional recovery" that would *operationally define* the condition of many children who have made excellent improvement in language, intelligence, and social behavior, but who may or may not be described as "totally recovered." Objective measures might include successful functioning in regular grade, ability to interact appropriately and independently in social situations, elimination of temper tantrums and other disruptive or avoidance behaviors, and normal functioning on standardized tests of language, intelligence, social adjustment, and academic subjects. This would allow for the establishment of an objective continuum of treatment outcomes, ranging from *slight or no improvement, to partial recovery, to functional recovery, to total recovery*. By describing each category in operational terms based on direct, replicable observations of behavior, much of the controversy regarding the effects of ABA treatment could be avoided, and the realistic benefits of ABA treatment could be more easily recognized and accepted.

CONCLUSION

Conceptualizing autism as a contingency-shaped disorder of verbal behavior that begins during the first year of life provides a new paradigm for behavioral research and treatment in the areas of prevention, earlier intervention, and recovery from autism. By beginning ABA therapy during the first 6 to 18 months and focusing on modification of the specific contingencies of reinforcement that may prevent or interfere with acquisition of verbal behavior, it may be possible to prevent many cases of autism and reduce the debilitating effects of many others. The duration and intensity of treatment may be reduced, and "functional recovery" from autism might become the norm and expected outcome of ABA treatment.

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